

iv., 398). It is stated that the Earl of Powys possesses an onyx containing the chrysalis of a moth.

It seems to be generally assumed, without any strong evidence, that rock-crystal and agate have been formed from solution in water, possibly superheated, and that in such cases as those mentioned above, various crystalline or fibrous minerals and low forms of plant life have been inclosed during the process of solidification.

Though this explanation is very possibly true in many cases, it does not account for all the appearances seen in moss-agates; and another possible mode of formation may be suggested by a brief account of some experiments made more than twenty years ago.

Ordinary crystals of ferrous sulphate dissolve readily in cold water; but if they are placed in a dilute solution of an alkaline silicate, an entirely new series of phenomena are produced, which were first described by J. D. Heaton, M.D., in a paper "On certain Simulations of Vegetable Growths by Mineral Substances" (Brit. Assoc. Report, 1867, p. 83). On immersing crystals of ferrous sulphate in a solution of sodium silicate of the density 1.065, very beautiful arborizations will soon begin to shoot perpendicularly upwards, attaining the height of three or four inches in a few hours. In a weaker solution roots can be caused to shoot downwards from a suspended crystal. The fibres contain silica and iron (less the weaker the solution); they are brittle, and more dense than the liquid in which they are formed. Examined by the microscope, the ultimate ramifications are cylindrical, tapering tubes, the walls of which are granular, showing no sign of crystallization. The roots are more abrupt and occasionally club-shaped in their terminations. The growth is interstitial like that of organized living tissue. "Supposing such purely mineral substances to have been formed in by-gone geological eras, and to have been accidentally fossilized in some primary or other ancient rock, they would very probably, when discovered by recent investigation, be pronounced to be an evidence of organized beings having existed contemporaneously with the formation of such rock."

In the following year a similar observation was made by Prof. W. C. Roberts-Austen (J. C. S., 1868, xxi., 274). A solution containing 4.9 per cent. of silica, when allowed to gelatinize, and dried for two days over sulphuric acid, left a solid residue similar to opal from Zimapan, but containing 21.4 per cent. of water. All the specimens of jelly dried in air contained dendritic forms, varying in size from 0.2 to 0.5 mm. When magnified 90 times they appeared as radiating fibres; when the power was increased to 700 times linear, each fibre resolved itself into a series of elongated beaded cells with clusters of circular cells at intervals. Mr. Slack indicated their remarkable analogy to common blue mould or mildew. The cells appeared to be hollow, and did not blacken with sulphuric acid.

A few years later I repeated Dr. Heaton's experiments, and made some additional ones, a brief account of which may induce some one with better means at his disposal to investigate an interesting and somewhat neglected subject.

If a crystal of copper sulphate be suspended in a solution of potassium silicate, which has been carefully neutralized and has a density of 1.065, in the course of a few minutes a hollow green column will be seen to run down from the crystal to the bottom of the beaker. Sodium silicate may be used instead of potassium silicate, but the appearance and rapidity of the growth is somewhat changed. The solution may be neutralized with hydrogen sulphate, chloride, or acetate, but hydrogen fluoride appears to prevent all growth. If the solution has a density less than 1.06, no growth occurs, and the crystals generally dissolve; the weaker the solution down to this limit the more rapid the growth. If the solution be stronger, the time required for the growth to com-

mence may be lengthened from minutes to many days. If the density be above 1.25, no growth takes place.

Copper sulphate gives the best results, but it may be replaced by ferrous, manganous, or nickel sulphate; with changes in the shape, and of course in the colour, of the growths. The growths take place most readily from a clean sharp crystal, and always from an angle or edge; an edge obtained by cleavage requires more time. Other salts besides the sulphates may be used, but do not act so rapidly, probably owing to less perfect crystallization of the specimens used.

In a neutral or very feebly alkaline solution the growths are comparatively rapid, and consist of long, branching, tapering fibres, not unlike the roots of a tree. They grow rather more rapidly downwards than upwards. If the solutions be decidedly alkaline, the growths are much slower, and consist of fine stalks with comparatively large lungs at the extremities.

The tubes seem to be composed of silica with a small proportion of the metal used; they differ much in colour, are more dense than the liquid in which they grow, and are insoluble in water or dilute acids. When magnified 100 times, the substance of the tube shows no appearance of crystalline form, but seems to consist of concretions of ovoid granules. In this particular it differs from the substance of lead or silver trees, and from the curious fibres of potassium, iodide, and chloride described by Mr. Warrington (J. C. S., v., 136, viii., 31).

It is generally assumed that the formation of onyx is due to the successive deposition of layers of silica coloured by different substances, but the following experiment suggests another possible method of formation, especially when the extreme permeability of gelatinous silica by liquids is remembered. So readily are even the hardest agates permeated by hot aqueous solutions of salts, that "staining" is a common commercial process.

A little too much sulphuric acid was accidentally added to a moderately strong solution of potassium silicate in which some crystals of copper sulphate were lying. The copper sulphate dissolved, and the solution set to a uniform blue jelly. After standing for about a week, the blue colour at the top of the jelly had separated into a series of thin parallel coloured plates, leaving the jelly between them colourless. This curious separation of the colouring-matter gradually proceeded downwards, and reached the bottom of the precipitating glass in about a month. The jelly gradually shrank, dried, and hardened, forming fragments consisting of blue bands in a white mass.

SYDNEY LUPTON.

NOTES.

THERE will be a memorial celebration for A. W. von Hofmann on November 12, arranged by the Deutsche Chemische Gesellschaft, at Berlin on the 25th anniversary of its foundation. The Empress Frederick and many German and foreign celebrities have been invited to be present. The proceedings, which will take place at the Berlin Town Hall, will include speeches on the history of the Society and on Hofmann, a review of progress in chemical science by Hr. Wislicenus, and choral music, performed by the members of the cathedral choir.

WE regret to have to record the death of Mr. Robert Grant, F.R.S., Professor of Practical Astronomy at the University of Glasgow. He died at Grantown-on-Spey, his native place, at the age of seventy-eight.

THE death of Dr. Löwenherz, director of the Imperial Physical Institute, Berlin, has been announced. He died at Berlin on Sunday last.

PROF. VIRCHOW has been appointed an honorary member of the Imperial Russian Natural Philosophy Society.

AN international ethnographical exhibition is to be held next year in St. Petersburg. It will be organized by the Russian Geographical Society.

THE American Microscopical Society offers prizes for the encouragement of microscopical research, two of the value of 50 dollars each, and two of the value of 25 dollars each, for the best papers which shall give the results of an original investigation made with the microscope, and relating to animal and plant life respectively; also two of the value of 30 and 15 dollars respectively for the best six photomicrographs in some subject of animal or vegetable histology; and two of the same value for the best collections of six mounted slides illustrating some one biological subject.

IN a letter to the *Times* on scientific titles and their abuse Prof. Tilden has opened a subject of considerable interest to men of science. It is well known that the letters indicating membership of a society are sometimes used by persons who have no right to use them, and Prof. Tilden notes that an effort is to be made to deal with this evil by getting a Bill before Parliament "for the purpose of securing to the respective societies the copyright of these letters." This, however, is a comparatively unimportant aspect of the question. The real difficulty is that membership of scientific societies is frequently "represented in courts of law or by candidates for public appointments as evidence of professional trustworthiness," whereas in very many cases it does not at all necessarily imply any extensive or accurate knowledge of the subjects in which the societies are especially interested. "Fellowship of the Royal Society, indicated by the letters F.R.S.," says Prof. Tilden, "is a real distinction which is justly prized. But what is the public to understand regarding such alliterations as F.B.S., F.C.S., F.E.S., F.G.S., F.L.S., F.S.S., F.Z.S., and of F.S.A., M.R.I., F.R.A.S., F.R.M.S., F.R.G.S., F.R.S.E., &c. ? With the exception of one or two of the societies represented here, admission is to be gained by almost any one who is willing to pay the customary contribution to the funds of the society, and who can get two or more members of the society to testify to his fitness for admission, which generally means respectability and a profession of interest in the subject, the cultivation of which is the object of the society." He adds that if the public knew all about the societies no harm would arise; but "judges and barristers, and county councillors and town councillors cannot be expected to have this knowledge." Prof. Tilden thinks that "the only chance for a better state of things is for every member of these societies who respects himself to abandon the use of these unmeaning letters altogether"; but he fears that there is very little prospect of such a general reform while "an Institute having for its president no less a person than the Heir Apparent to the throne condescends to bait its advertisements for subscribers with the offer of more letters. The *Times*, discussing the subject in a leading article, expresses the opinion that in the main "we must trust, imperfect though the security is, to the ability of grown-up men and women to protect themselves against a form of deception which has most hold over those who themselves covet the meaningless letters to which they blindly pin their faith."

THE weather during the past week has been characterized by a marked increase of temperature and excessive rainfall, accompanied by strong southerly winds and gales. Between Wednesday the 26th and Friday the 28th October, the temperature in parts of England increased upwards of 30°, while the air became very humid and unpleasant. The continuance of comparatively high temperature, during which the thermometer reached 60° in the central and southern parts of the kingdom, was due to the track of the depressions, causing a continual indraught of warm air from off the Atlantic. On Thursday the 27th ult., about 1

inch of rain was measured in the West of Ireland, and heavy falls occurred on the following days in the Midland counties. A further downpour, amounting to 1½ inch in the Channel Islands, and to 1·3 inch in London, occurred on Sunday night, and the amount which has fallen on the east coast of Norfolk during the month of October is about equal to three times the average. During the first part of the present week, the disturbance which caused the heavy rainfall passed away, and a small area of high pressure temporarily advanced over the United Kingdom from the Atlantic, while the temperature fell several degrees, with mist or fog in places; but conditions were very unsettled, and a change of wind to the south-eastward in Ireland gave indications of probable further disturbances. During the week ended the 29th ultimo, the amount of bright sunshine exceeded the mean in nearly all districts.

THE Meteorological Council have recently issued a summary of the *Weekly Weather Report* for the quarter ending September 1892, which shows the rainfall and mean temperature in each district for each similar quarter for the twenty-seven years 1866-92, grouped in five yearly averages, and also the means for individual years from 1881. The average rainfall of the quarter for the whole of the British Islands was 10·2 inches, or only 0·7 inch in excess of the mean for the whole period. This result is almost entirely due to an excess in the grazing or western districts, amounting to 1·5 inch, while in the wheat-producing or eastern districts the fall for the quarter is slightly below the mean. The temperature for the quarter has been below the mean generally; for the whole of the country the deficiency amounted to 1°·8, and was 1°·7 in the grazing districts and 1°·9 in the wheat-producing districts. Similar returns show that the excess of rainfall amounted to 1·5 inch in the same quarter of 1891, prior to which there had been a series of seven dry quarters, while the temperature has been uniformly below the mean for six corresponding quarters. The coldest quarter was in 1888, when the deficiency amounted to 2°·5, this being, in fact, the coldest corresponding quarter during the last twenty-seven years.

THE late Mr. George Grote, the historian of Greece, expressed in writing, eight years before his death, a desire that after his decease his cranium should be opened and his brain weighed and examined. The task was undertaken by the late Prof. John Marshall, and the results of his observations are set forth in a full report printed in the current number of the *Journal of Anatomy and Physiology*. The entire encephalon was somewhat above the average in size, if compared with the adult male brain at all ages. If allowance be made for the effects of senile wasting, it must be regarded as a rather large brain, but not as an actually or especially large one. There can be no doubt, however, that it was, at death, further diminished in size and weight through the effects of disease, as shown by its marked deviation from the ordinary ratio as compared with the body-weight. As tested by the standard of macrocephaly adopted by Welcker, its utmost allowable weight was below that standard; and as contrasted with the encephala of certain other eminent men, it would find its place about one-third up from the lower end of the list. The general form of the cranium was rather or nearly brachycephalic, but it was decidedly higher than usual. The cerebrum itself was, in accordance with the shape of the cranium, short, broad, and deep. The cerebral convolutions were very massive, being not only broad and deep, but well folded, and marked with secondary sulci. This condition was observable all over the cerebrum, but chiefly remarkable in the frontal and parietal regions. Studied in reference to Dr. Ferrier's researches into the localization of function in the brain, the relative size of certain convolutions or groups of convolutions suggested some reflections as to individual peculiarities, but these reflections did not seem to Prof. Marshall

to be quite trustworthy. From the size and richness of the convolutions, the sufficiency of the grey matter both on the surface and in the interior of the hemispheres, and from the remarkable number of the white fibres, especially of the transverse commissural ones, the brain of Mr. Grote is pronounced to have been of very perfect and high organization.

THE method of cleaning mercury adopted at the Physikalisch-technische Reichsanstalt at Berlin is described in the *Zeitschrift für Instrumentenkunde*. The raw material is brought in iron bottles from Idria. It is filtered and dried, and twice distilled in a vacuum to get rid of the heavy metals. Great care is taken to eliminate fatty vapours derived from greased valves and cocks, which is accomplished by means of a mercury pump working without a stopcock. Finally, the electro-positive metals, such as zinc and the alkalis, are separated by electrolysis. The mercury is precipitated from a solution of mercurous nitrate obtained by the action of nitric acid on excess of mercury. The solution, together with the impure mercury acting as an anode, is contained in an outside glass vessel, into which a current from a Gölcher thermopile is conducted by an insulated platinum rod. The cathode rod dips into an interior shallow glass vessel, in which the pure mercury is collected. On careful analysis it was found that no perceptible non-volatile residue was left by 200 grammes of the purified metal. Thus the mercury is well fit for use in standard barometers and resistances.

WITH regard to the revival of animals after exposure to great cold, Herr Kochs (in the *Biologisches Centralblatt*) points out two things which retard formation of ice in the animal body. First, the body does not contain pure water, but salt and albumen solutions, which only freeze under zero C. Then capillarity and adhesion hinder freezing. Herr Kochs states that water in a glass tube of 0.3 to 0.4 mm. diameter may be cooled to -7° and even -10° C. without freezing. With a diameter of only 0.1 to 0.2 mm. the water is not frozen, even though the end of the tube be put in freezing liquid. Thin liquid sheets between two glass plates behave in the same way. If a salt solution freezes, the salts are excluded; and pure water, in freezing, gets rid of its absorbed gas. Fresh blood, according to the author's experiments, freezes only after being strongly cooled to -15° C., and after complete elimination of gases and salts. The blood corpuscles are dissolved and the blood loses colour. The same elimination doubtless occurs in freezing of protoplasm. Experiments cited to show the possibility of "anabiosis" may probably be explained by the decomposition process not having gone so far as to bring life completely to a standstill. Similar results were obtained in experiments on drying of seeds and various animals. It was shown with what tenacity many animals, under most unfavourable circumstances, retain the moisture necessary to life.

THE very destructive American disease of the vine known as the "Black-rot" has, for some years past, made its appearance in Europe, and its life-history has now been thoroughly investigated by Viala, Ráthay, and others. The ravages of the disease have been traced to a parasitic fungus, *Lastadia Bidwellii*, the mycelium of which develops in the interior of the organ attacked, chiefly the young branches and berries, and produces spermogones and pycnids in the course of the summer. It is especially by the pycnospores that the fungus is disseminated. Towards the end of the period of vegetation sclerotes are formed, usually within the pycnids, and the conidiophores spring from these. Peritheces are also formed in May and June on the fallen and infected berries of the previous year. Until recently the ravages of this pest in Europe were confined to the French vineyards, but it has recently been detected in Austria and in Italy. The most effectual remedy for it is salts of copper.

THE results obtained from the botanical work done at the various experiment stations in the United States will in future be published in the form of an "Experiment Station Record," issued by the Department of Agriculture, under the editorship of Mr. Walter H. Evans.

ANGLO-INDIAN papers record the presentation of an interesting "piece of architecture" to the Madras Central Museum by Lord Wenlock. It is a hornets' nest, belonging probably to the species *Vespa cincta*. It is conical in shape, and is constructed of a material resembling rough paper or cardboard composed of woody portions of plants gummed up by the insects, and brought into the condition of paste by means of a viscid salivary secretion. The combs are placed in tiers and attached to each other by small columns of the same paper-like material of which the nest is composed. It is two feet in height, and about the same in circumference at the base. It was obtained in the course of one of His Excellency's tours.

M. DE NADAILLAC, in the current number of *La Nature*, discusses the significance of some of the facts which have been brought to light by the recent excavations of mounds in the Ohio Valley. The mound builders knew how to construct earth fortifications, which were of considerable extent and always remarkably adapted to the sites chosen. They buried their dead under tumuli of astonishing dimensions. Copper was the only metal they could work, and they undertook long journeys in search of it. Their weapons and implements were of stone. They made vases of pottery, and were able to produce representations of the human figure and of animals, both by sculpturing them in stone and by modelling them in clay. At least in some districts they were sedentary, and, like all sedentary populations, they had to obtain the means of subsistence in part by cultivation of the soil. They were often engaged in fighting, and numerous burials in which the bodies are crowded together bear witness to the fury of their struggles. Whence did they come and who are their descendants? M. de Nadaillac thinks that these questions can never be definitely answered unless investigators discover some traces of the language of the mound-builders.

AN interesting and valuable paper on the association of shipping disasters with colour-blind and defective far-sighted sailors, read by Dr. T. H. Bickerton before the section of Ophthalmology at the last annual meeting of the British Medical Association, has been reprinted for the author from the *British Medical Journal*. Dr. Bickerton takes anything but a hopeful view of the prospects of legislation on this important question. He greatly fears that "many a shipping disaster will occur before the Royal Society's suggestions become part of the law of the land." Accordingly he urges all who interest themselves in the subject to abate not a tittle of their endeavours. "There are none," he says, "so difficult to convince as those who will not believe, and the men who have had the framing of the rules of the road at sea are the very men who hitherto have turned from all suggestions on the eyesight question with contempt. True it is that their language, judged from examples to be found in the *Nautical Magazine*, is becoming moderate, and even polite, but they lack knowledge of this subject, and they will still require our best attention." Meanwhile, Dr. Bickerton presses on the attention of the public the following facts:—that 4 per cent. of the whole male population are colour blind; that about 8 per cent. more have marked impairment of sight from refractive errors; that there is no official test whatever as to a sailor's eyesight; that a man may be the subject of any of the forms of eye disease, may have any degree of blindness, or may be so short-sighted as to be unable to see distinctly more than a few inches in front of his nose, and yet be at perfect liberty to be a sailor and to become an officer; and that, although there is a

compulsory colour examination (in many cases a most inefficient one) to be passed before a sailor can become an officer, there is no check to a colour-blind man being a sailor, or to his remaining one to his life's end.

THE Rev. T. A. Marshall describes in the November number of the *Entomologist's Monthly Magazine* a new genus and species of Belytidæ from New Zealand. The paper is accompanied by representations of two insects in fine condition. Mr. Marshall abstains from giving tedious details, as the figures will, he believes, convey a better idea of these creatures than many words, and he thinks they will now be unmistakable, at least until other species of the same genus shall be discovered. He has not taken any characters from the under-side, the specimens being carded; hence the oral organs could not be described, but they may be pretty safely assumed to resemble those of *Belyta*, *Anectata*, &c., and their details would have been of little value.

A CORRESPONDENT of the New York journal *Electricity*, writing from Paris, describes some electrical peculiarities which he has seen in a cat. This cat, called Michon, is a half wild animal, and dislikes handling. It belongs to the household of Dame Gais, whose residence on the Carnier Mount, near Monte Carlo, looks directly down on the noted gambling casino and its botanical reservation. On some of the cold and very dry nights common to Monte Carlo in the winter, Michon, while in the dark, is quite a spectacle. Every movement of its body sends off hundreds of minute bluish sparks, something like those thrown off by ill-adjusted brushes, though not so pronounced in colour. They make a noise on a small scale, like the crackling of burning furze. Stroking the cat increases the sparking, and ruffling its fur the reverse way produces a miniature pyrotechnic display quite remarkable. The cat itself does not seem to mind the sparking, but, like all cats, dislikes to have its fur rubbed in a wrong direction. The writer has never seen the electric element so abundant in a cat, and many who have seen the coruscations that have given notoriety to Michon, confirm him in the opinion that the cat is an electrical curiosity.

A USEFUL account of "Biological Teaching in the Colleges of the United States," by Prof. John A. Campbell, of the University of Georgia, has been issued by the United States Bureau of Education. The writer's object is to present the actual extent and scope of the biological courses offered by the colleges of the United States, together with the methods of teaching employed. He also aims at presenting as fully as possible an account of the equipment and facilities for teaching which the various colleges possess. The statements he makes are therefore based largely upon the printed accounts found in the college catalogues, supplemented in many cases by letters containing additional information. These have usually been re-written, but where they are in suitable form they are quoted directly. Prof. Campbell notes that many of the colleges announce more in their catalogues than they can possibly do thoroughly with the teaching force employed. This is often perfectly apparent, but in more than one letter received the statement has been made that certain courses have no existence save on paper. Prof. Campbell, however, thinks that it is worth while to record the views of the professors in charge in regard to the nature and aims of such work, and the ideals towards which they are striving.

THE "Treatise on Hygiene and Public Health," edited by Dr. T. Stevenson and Mr. Shirley Murphy, and reviewed in NATURE last week, is published by Messrs. J. and A. Churchill.

MESSRS. J. AND A. CHURCHILL are publishing a second edition, revised and enlarged, of "Commercial Organic Analysis," by Alfred H. Allen. The second part of the third volume has just appeared. The third part of the same volume will be issued as soon as possible, and will complete the work. In the second part he has sought to describe fully and accurately such of the organic bases as have any practical interest, and to give trustworthy information as to their sources.

THE new number of *Natural Science* includes articles on the evolution of consciousness, by C. Lloyd Morgan; primæval man: a palæolithic floor near Dunstable, by W. G. Smith; the evolution of sharks' teeth, by A. S. Woodward; the walk of arthropods, by G. H. Carpenter; the falling of leaves, by A. B. Rendle; and Norwich Castle as a museum, by H. Woodward.

A REVISED edition of "London Birds and London Insects," by Mr. T. Digby Pigott, has been issued by Mr. H. Porter. Along with the essays on these subjects have been printed several other bright and attractive sketches.

AN elaborate index to the genera and species described in the "Palæontologia Indica," up to the year 1891, by W. Theobald, has just been issued. It is included among the Memoirs of the Geological Survey of India. Mr. Theobald has also prepared "Contents and Index of the Memoirs of the Geological Survey of India, 1859 to 1883."

A SECOND edition of Dr. F. H. Hatch's "Text-book of Petrology" has been issued by Messrs. Swan Sonnenschein and Co. The author explains that he has taken advantage of this opportunity to revise the book thoroughly, while largely increasing its scope.

THE Society for Promoting Christian Knowledge has published a second edition of Klein's "Star Atlas." Mr. E. McClure, the translator of Dr. Klein's explanatory text, has sought to bring up to date the German writer's descriptions of the more interesting fixed stars, star clusters, and nebulae.

MESSRS. ROBERT GRANT AND SON, Edinburgh, and Messrs. Williams and Norgate, London, have issued Parts II. and III. of Vol. XXXVI. of the Transactions of the Royal Society of Edinburgh. The following are the subjects of some of the papers:—the foundations of the kinetic theory of gases (IV.), by Prof. Tait; the solid and liquid particles in clouds, by J. Aitken; the development of the carapace of the chelonia, by J. B. Hayercraft; the composition of oceanic and littoral manganese nodules, by J. V. Buchanan; the winds of Ben Nevis, by R. T. Omond and A. Rankin; and the Clyde sea area, by H. R. Mill.

THE University College of Wales, Aberystwith, has issued its calendar for its twenty-first session, 1892-3.

THE City and Guilds of London Institute has issued its programme of technological examinations for the session 1892-93.

MESSRS. GEORGE PHILIP AND SON announce that a work on "British New Guinea," by Mr. J. P. Thomson, Hon. Sec. to the Brisbane Branch of the Royal Geographical Society of Australasia, is almost ready for publication. An appendix will contain contributions to the geology, fauna, flora, &c., by Sir William Macgregor, K.C.M.G., Baron Ferdinand von Mueller, Professor Liversidge, F.R.S., and others. The proof-sheets have been revised by Dr. H. Robert Mill and Dr. Bowdler Sharpe.

ANOTHER and apparently much more convenient mode of preparing glycol aldehyde, $\text{CH}_2\text{OH}.\text{CHO}$, the first member of the series of aldehyde-alcohols, is described in the current number of [the *Berichte*, by Drs. Marckwald and Ellinger, of

Berlin. It may be remembered that in our note of a fortnight ago (vol. 46, p. 596), it was announced that Prof. Emil Fischer and Dr. Landsteiner had succeeded for the first time in preparing this interesting substance in a state of tolerable purity by a reaction analogous to that of barium hydrate upon acrolein dibromide, the reaction which yielded the first synthetical glucose. They first prepared the mono-bromine, derivative of common aldehyde, $\text{CH}_2\text{Br} \cdot \text{CHO}$, and subsequently reacted upon this new substance, a liquid possessing an intolerably sharp odour, with baryta water. After removal of the baryta by sulphuric acid, and the hydrobromic and sulphuric acids by means of carbonate of lead, a liquid was obtained which possessed the properties of a dilute solution of glycol aldehyde. Some time ago Pinner obtained a derivative of this aldehyde which bore the same relation to glycol aldehyde, that the compound known as acetal,

$\text{CH}_3 \cdot \text{CH} \begin{matrix} \diagup \text{OC}_2\text{H}_5 \\ \diagdown \text{OC}_2\text{H}_5 \end{matrix}$, bears to common aldehyde. This substance,

glycol acetal, $\text{CH}_2\text{OH} \cdot \text{CH} \begin{matrix} \diagup \text{OC}_2\text{H}_5 \\ \diagdown \text{OC}_2\text{H}_5 \end{matrix}$, Pinner attempted to de-

compose, by the action of mineral acids, into ethyl alcohol and glycol aldehyde. The attempt, however, did not succeed, inasmuch as the decomposition went further, any glycol aldehyde that may have been formed during the first stage of the reaction being subsequently broken up. Drs. Marckwald and Ellinger now find that the reaction succeeds admirably, provided the acid employed is extremely dilute, and as glycol acetal is a substance very easily prepared, they show that the reaction affords a very convenient and advantageous method of preparing large quantities of glycol aldehyde. The glycol acetal is added to an equal volume of water acidified with only a few drops of sulphuric acid. The liquid is then heated to boiling. After a short time the two liquids mix, and the reaction is completed when upon the addition of water to a few drops of it no separation of oil occurs. Upon distilling the liquid product, alcohol first passes over, then there distils a mixture of water and glycol aldehyde until decomposition of the residue commences. Glycol aldehyde, as thus obtained in a tolerably concentrated form, appears to be much more volatile in steam than was observed by Prof. Fischer and Dr. Landsteiner, in case of their more dilute solutions. From a few cubic centimetres of the distillate Drs. Marckwald and Ellinger obtained a very considerable quantity of Prof. Fischer's phenylhydrazine compound, and confirm in every detail the other properties of glycol aldehyde described in our previous note above referred to. The chemistry of this first member of the series which includes the sugars is now, therefore, fairly complete, and the difficulties in the way of its preparation surmounted.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♂) from India, presented by Mr. Pascoe Grenfell, F.Z.S.; a Philantomba Antelope (*Cephalophus maxwelli*) from West Africa; three Gambian Pouched Rats (*Cricetomys gambianus*) from West Africa; a Ground Rat (*Aulacodus swindernianus*) from West Africa; and a White-faced Tree Duck (*Dendrocygna viduata*) from West Africa, presented by Mr. C. B. Mitford; a Martial Hawk-Eagle (*Spizaetus bellicosus*) from South Africa, presented by Mr. T. White; two Weaver Birds (*Hyphantornis sp. inc.*) from South Africa, presented by Mr. A. W. Arrow-smith; two Silver Pheasants (*Euplocamus nycthemerus* ♂♂) from China, presented by Mr. E. Mitchener; a Common Chameleon (*Chamaeleon vulgaris*) from North Africa, presented by Miss Kate Higgins; a Thick-tailed Opossum (*Didelphys crassicaudata*) from South America; a Garden's Night-Heron (*Nycticorax gardeni*); and two Saracura Rails (*Aramides saracura*) from South America, purchased; and a Squirrel Monkey (*Chrysotrrix sciurea*) from Guiana, deposited.

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OUR ASTRONOMICAL COLUMN.

COMET BROOKS (AUGUST 28).—The following ephemeris, which we take from *Astronomische Nachrichten*, No. 3125, gives the apparent Right Ascensions and Declinations of Comet Brooks, which is brightening very rapidly:—

12h. Berlin M.T.

1892.	R.A. app. h. m. s.	Decl. app. °	Log. r.	Log. Δ.	Br.
Nov. 3 ...	9 23 51 ...	+9 55'8			
4 ...	27 50 ...	9 9'8 ...	0'1265 ...	0'0225 ...	11'60
5 ...	31 51 ...	8 22'7			
6 ...	35 55 ...	7 34'6			
7 ...	40 1 ...	6 45'4			
8 ...	44 10 ...	5 55'2 ...	0'1125 ...	0'0034 ...	13'51
9 ...	48 21 ...	5 4'0			
10 ...	52 34 ...	4 11'8			

Lying in the extreme northern corner of the constellation of Sextans, and nearly midway between ρ Leonis and ϵ Hydræ, it will not be an easy object for observation owing to its very late rising.

COMET BARNARD (OCTOBER 12).—Prof. R. Schorr, of Hamburg, communicates to *Astronomische Nachrichten*, No. 3125, the elements and ephemeris of Comet Barnard, deduced from observations made on October 16, 18, and 20, at Vienna, Hamburg, and Pulkowa respectively. As this ephemeris differs rather considerably from the one we gave last week, the following places may prove of service to observers:—

12h. Berlin M.T.

1892.	R.A. app. h. m. s.	Decl.	Log r.	Log Δ.	Br.
Nov. 3 ...	20 24 38 ...	0 5'37			
4 ...	27 20 ...	4 44'0			
5 ...	30 4 ...	4 24'6 ...	0'2298 ...	0'1539 ...	1'00
6 ...	32 48 ...	4 5'4			
7 ...	35 34 ...	3 46'4			
8 ...	38 21 ...	3 27'8			
9 ...	41 9 ...	3 9'4 ...	0'2278 ...	0'1590 ...	0'99
10 ...	43 58 ...	2 51'2			

This comet will still be found to form approximately an equilateral triangle with α Aquilæ and β Delphini on November 5.

TABULAR HISTORY OF ASTRONOMY TO THE YEAR 1500 A.D.—Dr. Felix Müller, of Berlin, has just completed a small volume entitled "Zeitafeln zur Geschichte der Mathematik, Physik und Astronomie bis zum Jahre 1500," which will be welcomed by all interested in the very early history of the exact sciences. The book is arranged chronologically and gives a short account of the chief workers in these branches of science up to the year 1500. At the end of each reference a list of the literature likely to be needed is added. The work is published by Messrs. B. G. Teubner, Leipzig.

A LARGE TELESCOPE.—The Americans seem to have made up their minds to be the possessors of the largest telescopes in existence, for in spite of their owning the great Lick Refractor (36-inch) we hear now that the University of Chicago are about to have "the largest and most powerful telescope in the world." This instrument will be the gift of Mr. Charles Jerkes, and will cost half a million dollars. The object-glass will have a diameter of 45 inches and will be made by Messrs. Alvan Clark, of Cambridge, Mass.

THE ATMOSPHERES OF PLANETS.—Of all the planets that revolve round our sun, Jupiter affords the most suitable of them for the study of atmospheric circulation. That his circulation will not be exactly like ours will be at once evident, for not only does the sun pour his rays on his vast surface, but he possesses himself heat, as is suggested by the rapid changes which these cloud masses undergo. A recent hypothesis, explaining the various movements in this planet's atmosphere, has been put forward by Mr. Marsden Manson, in the fifth number (vol. ix.) of the "Transactions of the Technical Society of the Pacific Coast," San Francisco. The chief element which produces these movements is the action of the sun, and it is on this reasoning that he attempts to unravel the laws underlying the circulation in Jupiter's atmosphere. In this pamphlet he first brings together some of the facts relating to our own wind system, which are generally conceded, together with the important results that were gathered from the path taken by the Krakatoa